Is Agricultural Policy Decoupling against Human Nature? Experimental Evidence of Fairness Expectations' Contributions to Payment Incidence

May 3, 2010

Mariah D. Ehmke, PhD
Amy Nagler, MSc
Dale Menkhaus, PhD
Chris Bastian, PhD*
C. Edwin Young, PhD**

*Assistant Professor, Research Associate, Professor, and Associate Professor
Department of Agricultural and Applied Economics
University of Wyoming
1000 E. University Avenue
Dept. 3354
Laramie, WY 82071, USA
e-mail: mehmke@uwyo.edu
Phone: (307) 766-5373

**Senior Policy Analyst
United States Department of Agriculture
Economic Research Service

Selected Paper prepared for presentation at the Agricultural and Applied Economics Association 2010 AAEA, CAES, & WAEA Join Annual Meeting, Denver, Colorado, July 25-27, 2010

Abstract

The objective of this research is to measure individuals' fairness expectations and relate them to their market behavior in a private-negotiation institution. By doing this, we may inform model parameterization of field data and increase understanding of payment incidence causation. We hypothesize agents will change both their market and UG behavior when the tenant/proposer receives a subsidy following a successful negotiation. We also hypothesize that agents' market behavior does relate to their fairness expectations in the UG. Two economic experiments were developed to test our hypotheses, a market and an ultimatum bargaining game experiment. We recruited 106 undergraduate students and conducted the experiments in an experimental laboratory using a computer based market mechanism. Our findings suggest fairness expectations need to be considered as a possible constraint on agents' profit maximization behavior in land markets. The experimental evidence indicates market sellers or landlords demand higher land rental prices when tenants receive per-unit subsidies. Their ability to obtain a higher price appears to be more formidable in markets with limited matching opportunities. We conclude fairness expectations may constrain individuals' profit-maximization behavior in the land market and, in turn, affect payment incidence in this market.

Is Agricultural Policy Decoupling against Human Nature? Experimental Evidence of Fairness Expectations' Contributions to Payment Incidence

Introduction

In the Uruguay Round Agreement on Agriculture, members of the World Trade Organization sought agriculture policies that would not distort world agriculture commodity markets. Subsequently, they developed three categories of policies—amber, blue, and green box. The most trade distorting policies are in the amber box while those which are least trade distorting are in the green box. Policies which are decoupled–or the transfer of payments to farmers is not reliant on agricultural production levels—are considered green box policies. In response, the US developed various decoupled payments, including production flexibility contracts, counter-cyclical payments, and loan deficiency payments. These policies are generally referred to as Agricultural Market Transaction Act or AMTA payments (Barry K. Goodwin and Ashok K. Mishra, 2006). However, research reported to date does not support their classification as green box policies (see Arathi Bhaskar and John C. Behin, 2009 for a review). Analysts find that consequently these policies affect farmers' capital constraints, land value and use, and labor allocation. In fact, findings from payment incidence studies suggest land values or rental rates increase with AMTA payment eligibility (Terry Roe et al., 2003). The goal of this research is to identify dynamics underlying the land rental market that lead to payment incidence. We focus on individuals' fairness expectations.

Land value is easily captured according to its rental price. This price is typically established through private negotiation between landlords and tenants. The negotiation process is similar to an ultimatum bargaining game (UG)—the tenant (proposer) may make an offer to rent land and the landlord (respondent) may accept or reject the offer. Kahneman, Knetsch, and Thaler (1986) suggest firm profit maximization is subject to a fairness constraint in addition to traditional resource constraints. Thus, both the tenant's offer and the landlord's response will depend on social fairness expectations as well as their own profit maximization objective. For example, landlords may require a higher rent from a tenant receiving AMTA payments on their land depending on their fairness expectations. Similar to consumers in the market place, they expect the rent of their land to fluctuate with the firm's or tenant's cost of production or profit margin. We use a combination of market and UG experiments to determine the possible constraints fairness may place on agents' profit maximization.

Experimental tests of UG behavior suggest the institutional negotiation environment does affect people's fairness expectations, and thus, the final endowment allocation. For example, Fischbacker, Fong, and Fehr (2009) find the number of respondents and proposers in an UG game affects the endowment allocation due to increased competitiveness among recipients or proposers. In the case of rental contract negotiations, the number of tenants and landlords in an area may affect the rental rate. Also, if acreage is tied to an AMTA payment, it may increase the opportunity cost of a lost contract for the tenant.

While Roe, Somwarue and Diao find payment incidence occurs in land markets, they also discuss the difficulty of estimating the true pass-through rate of AMTA-like

payments. Several variables create noise in the estimates, including capital constraints, tax policies, and incomplete markets. Economic laboratory experiments offer the opportunity to control for these confounding variables and measure the subsidy pass-through rates in a land market institution. The laboratory can also be adapted to measure individuals' fairness expectations with and without subsidy-like incentives. The objective of this research is to measure individuals' fairness expectations and relate them to their market behavior in a private-negotiation institution. By doing this, we may inform model parameterization of field data and increase understanding of payment incidence causation. We hypothesize agents will change both their market and UG behavior when the tenant/proposer receives a subsidy following a successful negotiation. We also hypothesize that agents' market behavior does relate to their fairness expectations in the UG. We now describe the methods and data collection procedures used to test these hypotheses. These descriptions are followed by our results and conclusions.

Methods

Two economic experiments were developed to test our hypotheses, a market and an ultimatum bargaining game experiment. We recruited undergraduate students, mainly from economics and business classes. The sessions occurred in an experimental economics laboratory using a computer network and typically took one and a half hours. The subjects were paid a $7 show up fee in addition to their earnings in both experiments. Earnings were denoted in a monetarily-convertible currency referred to ask tokens (1 token equaled 1 cent). Average earnings from the market experiment, paid to participants in addition to their $7 show-up fee, were $32.45 for sessions. The total

average earnings from the UG game experiment, including the $1 subsidy payment, were $1.60.

Private Negotiation Market Experiment

The market experiment used private negotiation trading. Private negotiation is the relevant trading institution in many land rental markets. In private negotiation two agents, a buyer and a seller, make offers and counteroffers until there is agreement on price and other contractual arrangements. The market is comprised of two parts: a method of trading and a method of delivery. Two methods may be used in delivery of goods traded: advance production or forward delivery. In advance production sellers enter a market with inventory in stock, incurring sunk costs before sales. In a forward market transaction, price and quantity are agreed upon before production. In the land market, sunk costs associated with advance production (and their resulting risks and incentives) are not relevant. Land is not "produced" *per se* before it is rented, nor does it lose value if it is not rented. The risk associated with advance production is not significant. As a result, the experimental market developed for this research uses forward delivery.

There were three market experiment treatments, summarized in Table 1. In the first treatment, Treatment 1, the buyer received a per-unit subsidy or 20 tokens for each unit traded. This payment is equivalent to a coupled price support. There was also random matching of buyers and sellers. This matching procedure controlled for the likelihood of reputation effects on the market price. In Treatment 2 the buyer did not receive a subsidy, but was allowed to find a seller through a mutual selection process. Thus, reputation effects were allowed to influence market price. This base treatment with no subsidy paid out allows for comparison of market impacts under alternative

subsidy policies. In the final treatment of the market experiment, Treatment 3, the buyer received the per-unit 20 token subsidy and also chose their seller. All participants are informed of policy treatments via instructions prior to trading.

In each round of Treatment 1 trading, four buyers and four sellers were randomly paired to negotiate prices and trade up to eight units over three bargaining rounds. Random pairing controlled for the confounding effects of reputation on trading outcomes. Before trading began, every buyer received a private table of unit redemption values for eight units while each seller received a corresponding table with unit costs for eight units. Redemption values began at 130 tokens for unit one and increased by 10 to 60 tokens for the eighth unit. Costs began at 30 tokens and increased by 10 to 100 tokens. Buyers earned the difference between the redemption value for the unit traded and the negotiated price across rounds. Likewise, sellers earned the agreed price minus their unit cost. Each participant received a trading period report, stating their private earnings for each period. Treatments 2 and 3 were conducted like Treatment 1, but the buyers were allowed to choose their trading partner.

Each session consisted of at least 20 trading periods. The final number of trading periods was not revealed to the subjects to avoid strategic behavior. The market price was expected to converge to 80 tokens. These expectations were based on step functions of individual and aggregate unit cost and redemption value schedules following Davis and Holt (1993, pp. 9-14). We provide a graphical representation of the expected outcomes in Figure 1.

Ultimatum Bargaining Game Experiment

We conducted an additional UG experiment to measure participants' fairness expectations. This experiment was conducted both in sessions with a market and without a market experiment to test the effect of market participation on fairness expectations. When a market experiment preceded the UG experiment, participants retained their market roles when they were paired to play in the UG experiment. The four participants acting as buyers in the market experiment were then assigned to be proposers. The four market sellers acted as responders in the UG experiment. The UG experiment followed methodology developed by Guth *et al.* (1982). However, the Proposer and Responder decision processes were simultaneous and the extensive form of the game collapsed into one step. In the first treatment, the Proposer decided how much of their $5 endowment to allocate to the respondent. The Proposer had 11 discrete choice options. The Proposers worksheet is presented in Appendix I. The options are divided into 10 percent increments from zero to 100 percent of the endowment. At the same time as the Proposers made their allocation decision, the Responders had a similar worksheet to complete (see Appendix I). Responders decided the minimum amount of the endowment they were willing to accept from the Proposer. Once all of the worksheets were marked, the experimenter collected them. In the second treatment of the UG experiment, the Proposer was offered a one dollar bonus if there was a successful match (*i.e.*, the Respondent's demand was less than or equal to their offer).

The earnings from the ultimatum bargaining game experiment were determined by the experimenter at the end of the experiment session. The experimenter did this by matching Proposers and Respondents' answers according to randomly predetermined matching arrangements. If the Proposer suggested a payment above the Respondent's

minimum payment requirement, then the allocation was divided as the Proposer suggested. The Proposer also received his one dollar bonus with the second treatment earnings following a successful negotiation. If the Proposer did not make an offer acceptable to the Respondent, then neither party receives payment. The Proposer did not receive a bonus in the second treatment either.

The order of the first and second treatments of the UG game was randomly determined in each session. The UG game followed the market experiment in all sessions with a market experiment.

Results

Data were collected from 106 student subjects from September 2008 to January 2009. Seventy two subjects participated in both the ultimatum bargaining game (UG) and a market experiments. A second control group, consisting of 34 subjects, only participated in the UG experiment.

The Market Experiment Results

The market prices per market experiment treatment are presented in Figure 2. The market price is expected to converge to $80 in each treatment. In Treatment 1, however, the converged average price per round is much higher, $85.00. The price is lower than predicted in both Treatment 2 and 3. It is $76.90 in Treatment 2 and $77.80 in Treatment 3. While the per-unit subsidy brings up the market price across treatments, only the Treatment 1 price is significantly different from the Treatment 2 price ($\alpha<0.05$). The Treatment 1 price is also significantly different from the Treatment

3 price. Thus, it appears subsidization, especially with random matching, results in price elevation in the market institution.

The Ultimatum Bargaining Game Results

The ultimatum bargaining game data are summarized in Table 2. The overall mean Proposer offer was 49 percent of the endowment (σ=13 percent). Responders (Sellers in the market experiment) demanded 53 percent of the endowment on average (σ=19 percent). The mean offers and demands are reported, by treatment in Table 2. Using t-test statistics of the mean endowment offer or demand, there were no significant differences between the mean proposers' offer and the respondents' demand in either treatment. Further, although the mean respondent demand increases substantially from the Control to Subsidy treatment, the increase is not significant (*i.e.*, $\alpha \leq 0.10$).

We conducted additional Chi-Square tests for distributional differences in Proposers' offers and Respondents' demands across the subsidy and no-subsidy treatments. Graphs of the cumulative distribution functions are displayed in Figures 3 and 4. There was not a significant difference in Proposers' offers from the subsidy to the no-subsidy treatments ($\alpha \leq 0.10$). There was, however, a significant difference in the frequency of Respondents' demands when a subsidy was offered (χ^2=24.49, α=0.00). The cumulative distribution function moves to the right or Respondents demand more of the endowment when the subsidy was offered. Consistent with the market findings, the subsidy affected agent behavior.

Market and UG Behavior Analysis

We estimated two logit models of agents' average market bid behavior as a function of their UG bargaining behavior. If an agent's average bids were above the

market average then the dependent variable is one. If the average bid was at or below the market average bid then the dependent variable is zero. These models only include data from those people who participated in the market (*i.e.*, 72 Proposers and 72 Respondents). The first model was estimated for respondents or sellers. The second was for proposers or buyers. The explanatory variables included the percentage of the endowment they demanded (by Respondents) or proposed (by Proposers) in the UG game, the presence of a market subsidy in the market experiment, their gender identification (female equals one and male equals zero), and a dummy variable entitled Choice. Choice was equal to one if the buyer and seller were allowed to find each other in the market and zero if they were randomly matched by the experimenter.

The results of the first, Proposer/Buyer/Tenant Model indicate there is a significant relationship between the proposer's endowment offer and their average market bids (see Table 3). Proposers who made higher offers in the UG game were 56 percent less likely to have higher than average market bids, when controlling for the presence of a market per-unit subsidy. The presence of a per-unit subsidy increased the buyer/tenants tendency to submit high average bids by 22 percent. These results indicate UG Proposers who were willing to give more to the respondent tended to have lower than average market bids when they were Buyers/Tenants in the marketplace.

On the other hand, UG Respondents' endowment demand behavior was positively related to their average market bidding behavior in the Respondent/Seller/Landlord Model. As a Respondent increased his or her endowment demand by 10 percent, they were also 33 percent more likely to have higher than average market bidding behavior.

We also designed a multinomial logit model to predict the likelihood a participant had a low, 50-50 split, or high UG demand or offer. We estimated this model for all UG experiment participants, including both Respondents and Proposers regardless of their market experience. The dependent variable was zero when the Respondent or Proposer has an offer or demand below 50 percent of the endowment, one when the offer or demand was 50 percent of the endowment, and two when the offer or demand was above 50 percent of the endowment. The explanatory variables included a UG treatment dummy variable (equal to one in the subsidy treatment and zero otherwise), role dummy variable (equal to one for Proposer and zero for Respondents), gender dummy variable (equal to one for women and zero for men), and market participant dummy variable (equal to one for market participants and zero for non-market participants). The model results are displayed in Table 4.

Market participants were approximately nine percent less likely to submit a low UG offer or demand than non-market participants. The likelihood of a proposal to divide the endowment in half decreased when a matching reward was offered to the Proposer. However, Proposers were approximately 25 percent more likely to propose a 50-50 division of the endowment than respondents. Respondents were 24 percent more likely to submit a high demand than Proposers were to submit a high offer. Market participation increased the likelihood of an equal division offer or demand by 11 percent. Naturally, the probability of a higher offer or demand increased when the Proposer was offered a matching reward.

Discussion

Our findings suggest fairness expectations need to be considered as a possible constraint on agents' profit maximization behavior in land markets. The experimental evidence indicates market sellers or landlords demand higher land rental prices when tenants receive per-unit subsidies. Their ability to obtain a higher price appears to be more formidable in markets with limited matching opportunities. The increased market price in our private-negotiation framework may translate to higher rental rates in the field and subsequently higher land prices. Previous findings identify payment incidence as a consequence of current AMTA payment policy design and suggest incidence result from capital constraints, tax policies, and incomplete markets (Terry Roe, Agapi Somwaru and Xinshen Diao, 2003). We acknowledge these may be important, but so are basic human fairness expectations.

Further research is needed to develop farm policy which is truly decoupled, not affecting capital market values or crop production. Further experimental economic research may be used to design and/or test-bed policies that consider the fairness constraints firms and individuals face. Other, experimental research suggests reducing matching risk will be an important consideration (Dale J. Menkhaus et al., 2007). Buyers in all markets are conscious of firms' profit margins. When they perceive the firm or another individual has an unfair advantage, they will demand a larger portion of the pie (Daniel Kahneman, Jack L. Knetsch and Richard Thaler, 1986). In the case of the land-rental markets, subsidy payments based on historical output are likely to drive up the value of land-related to specific types of output and, thus, affect crop production

decisions. This, then directly violates the fundamental green-box policy objectives and US policy designed to meet this objectives.

Appendix I: Experiment Instructions

Control Experiment 2 Bid Sheet - C

Proposer's Participant Number:_____

Proposer: I choose the following option:

Choice					
1	I will give	$0.00	to the Responder and keep	$5.00	.
2	I will give	$0.50	to the Responder and keep	$4.50	.
3	I will give	$1.00	to the Responder and keep	$4.00	.
4	I will give	$1.50	to the Responder and keep	$3.50	.
5	I will give	$2.00	to the Responder and keep	$3.00	.
6	I will give	$2.50	to the Responder and keep	$2.50	.
7	I will give	$3.00	to the Responder and keep	$2.00	.
8	I will give	$3.50	to the Responder and keep	$1.50	.
9	I will give	$4.00	to the Responder and keep	$1.00	.
10	I will give	$4.50	to the Responder and keep	$0.50	.
11	I will give	$5.00	to the Responder and keep	$0.00	.

Note: Circle the allotment you propose to give the responder. If the Responder rejects it, then neither one of you will receive any money for Experiment 2.

Control Experiment 2 Bid Sheet - C

Responder's Participant Number:_____

Responder: I am willing to accept the following choice (Please circle the choice you find acceptable):

Choice					
1	I will accept	$0.00	and the Proposer will keep	$5.00	.
2	I will accept	$0.50	and the Proposer will keep	$4.50	.
3	I will accept	$1.00	and the Proposer will keep	$4.00	.
4	I will accept	$1.50	and the Proposer will keep	$3.50	.
5	I will accept	$2.00	and the Proposer will keep	$3.00	.
6	I will accept	$2.50	and the Proposer will keep	$2.50	.
7	I will accept	$3.00	and the Proposer will keep	$2.00	.
8	I will accept	$3.50	and the Proposer will keep	$1.50	.
9	I will accept	$4.00	and the Proposer will keep	$1.00	.
10	I will accept	$4.50	and the Proposer will keep	$0.50	.
11	I will accept	$5.00	and the Proposer will keep	$0.00	.

Note: Please circle the choice that corresponds with the minimum amount of money you are willing to accept from the Proposer. If the Proposer proposes an amount that you do not accept, then neither one of you will receive any money for Experiment 2.

Test Experiment 2 Bid Sheet - T

Proposer's Participant Number:_____

Proposer: I choose the following option (Please circle one choice):

Choice					
1	I will give	$0.00	to the Responder and keep	$5.00	.
2	I will give	$0.50	to the Responder and keep	$4.50	.
3	I will give	$1.00	to the Responder and keep	$4.00	.
4	I will give	$1.50	to the Responder and keep	$3.50	.
5	I will give	$2.00	to the Responder and keep	$3.00	.
6	I will give	$2.50	to the Responder and keep	$2.50	.
7	I will give	$3.00	to the Responder and keep	$2.00	.
8	I will give	$3.50	to the Responder and keep	$1.50	.
9	I will give	$4.00	to the Responder and keep	$1.00	.
10	I will give	$4.50	to the Responder and keep	$0.50	.
11	I will give	$5.00	to the Responder and keep	$0.00	.

Note: Circle the allotment you propose to give the responder. If the Responder rejects it, then neither one of you will receive any money for Experiment 2.

If the Responder agrees with your choice, you will receive the allotment in the choice plus $1.00.

Test Experiment 2 Bid Sheet - T

Responder's Participant Number:_____

Responder: I am willing to accept the following choice (Please circle the choice you find acceptable):

Choice					
1	I will accept	$0.00	and the Proposer will keep	$5.00	.
2	I will accept	$0.50	and the Proposer will keep	$4.50	.
3	I will accept	$1.00	and the Proposer will keep	$4.00	.
4	I will accept	$1.50	and the Proposer will keep	$3.50	.
5	I will accept	$2.00	and the Proposer will keep	$3.00	.
6	I will accept	$2.50	and the Proposer will keep	$2.50	.
7	I will accept	$3.00	and the Proposer will keep	$2.00	.
8	I will accept	$3.50	and the Proposer will keep	$1.50	.
9	I will accept	$4.00	and the Proposer will keep	$1.00	.
10	I will accept	$4.50	and the Proposer will keep	$0.50	.
11	I will accept	$5.00	and the Proposer will keep	$0.00	.

Note: Please circle the choice that corresponds with the minimum amount of money you are willing to accept from the Proposer. If the Proposer proposes an amount that you do not accept, then neither one of you will receive any money for Experiment 2.

If you agree with the Proposer's choice you will receive the allotment and the Proposer will receive the allotment plus $1.00.

References

Bhaskar, Arathi and John C. Behin. 2009. "How Coupled Are Decoupled Farm Payments? A Review of the Evidence." *Journal of agricultural and Resource Economics*, 34(1), pp. 130-35.

Davis, Douglas D. and Charles A. Holt. 1993. *Experimental Economics*. Princeton: Princeton University Press.

Fischbacker, Urs; Christina M. Fong and Ernst Fehr. 2009. "Fainess, Errors, and the Power of Competition." *Journal of Economic Behavior and Organization*, 72, pp. 527-45.

Goodwin, Barry K. and Ashok K. Mishra. 2006. "Are "Decoupled" Farm Program Payments Really Decoupled? An Empirical Evaluation." *American Journal of Agricultural Economics*, 88(1), pp. 73-89.

Guth, Wener; Rolf Schmittberger and Bernd Schwarze. 1982. "An Experimental Analysis of Ultimatum Bargaining." *Journal of Economic Behavior and Organization*, 3, pp. 367-88.

Kahneman, Daniel; Jack L. Knetsch and Richard Thaler. 1986. "Fairness as a Constraint on Profit Seeking: Entitlements in the Market." *American Economic Review*, 76(4), pp. 728-41.

Menkhaus, Dale J.; Owen R. Philips; Chris T. Bastian and L. B. Gitting. 2007. "The Matching Problem (and Inventories) in Private Negotiation." *American Journal of Agricultural Economics*, 89(4), pp. 1073-84.

Roe, Terry; Agapi Somwaru and Xinshen Diao. 2003. "Do Direct Payments Have Inter-Temporal Effects on U.S. Agriculture?," In *Government Policy and Farmland Markets: The Maintenance of Farmer Wealth,* ed. C. B. Moss and A. Schmitz, 115-39. Ames:
Iowa State Press.

Table 1. Summary of treatment combinations

Treatment	**Subsidy**	**Matching Risk**
Treatment 1	Per-unit Subsidy	Random Pairs
Treatment 2	No Subsidy	Buyer Choose
Treatment 3	Per-unit Subsidy	Buyer Choose

Table 2. Proposer offer and respondent demand summary statistics for the control and subsidy treatments

Treatment	Variable	Mean	Standard Deviation
		Percent of Endowment	
Control	Proposer Offer	48	13
	Respondent Demand	51	19
Subsidy	Proposer Offer	50	14
	Respondent Demand	55	20

Table 3. Marginal effects from logit analysis of agents' average market bids

Independent Variable	Proposer/Buyer/Tenant Model	Respondent/Seller/Landlord Model
	Marginal Effect (Standard Error)	Marginal Effect (Standard Error)
Endowment Percentage	-0.56*	0.33*
	(0.31)	(0.13)
Subsidy	0.22*	0.1
	(0.12)	(0.08)
Gender	0.17	0.09
	(0.14)	(0.07)
Choice	-0.23	-0.07
	(0.12)	(0.07)
Log-Likelihood Ratio	10.4***	7.28***

* > 90% significant, **>95% significant, *** > 99% significant

Table 4. Marginal effects of multinomial logit analysis of participants' UG behavior

Variable	All Participants[A]
	Probability of Low Offer/Demand
UG Subsidy Treatment	-0.0284
	(0.0560)
Role	-0.0186
	(0.0580)
Gender	0.0314
	(0.0651)
Market Participant	-0.0852*
	(0.0494)
	Probability of 50-50 Offer/Demand
UG Subsidy Treatment	-0.2246***
	(0.0670)
Role	0.2552***
	(0.0680)
Gender	-0.0271
	(0.0753)
Market Participant	0.1076***
	(0.0605)
	Probability of High Offer/Demand
UG Subsidy Treatment	0.2530***
	(0.0632)
Role	-0.2366***
	(0.0647)
Gender	-0.0043
	(0.0732)
Market Participant	-0.0223
	(0.0570)
Log-Likelihood Ratio	28.7498***

* > 90% significant, **>95% significant, *** > 99% significant

[A]The marginal effect standard errors are reported in parentheses.

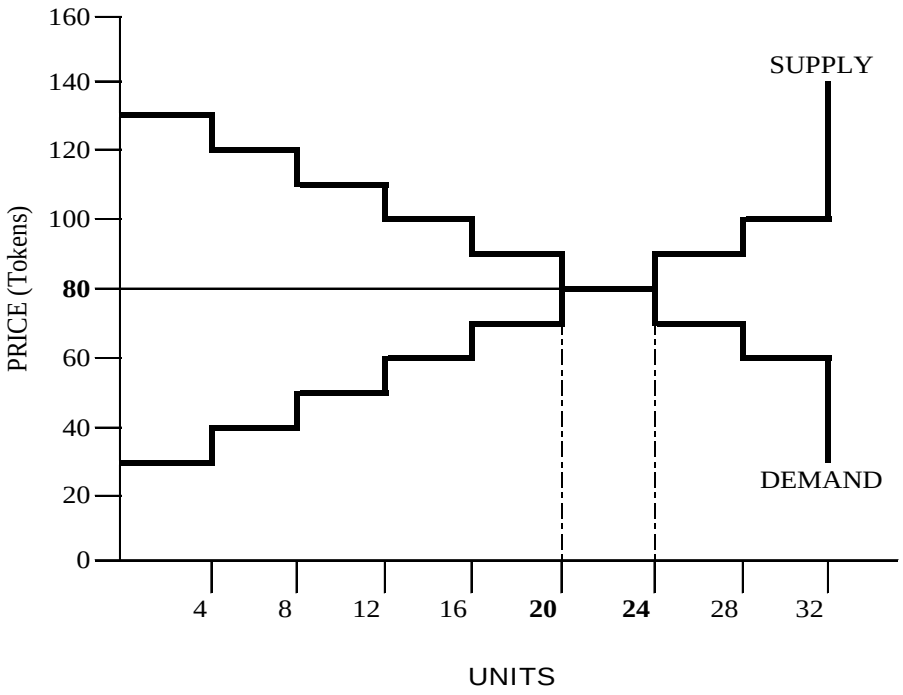

Figure 1. Market equilibrium prediction for the private negotiation experiment

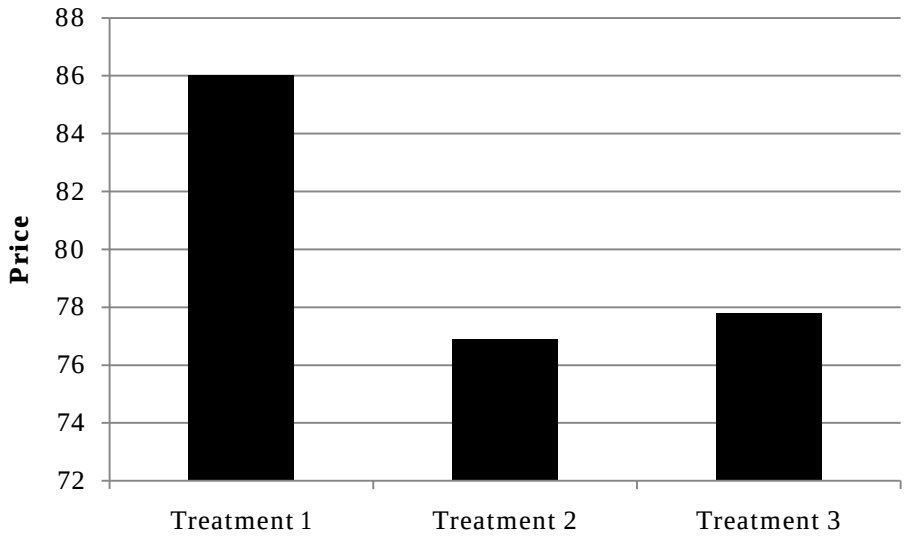

Figure 2. Converged average market price per round by treatment

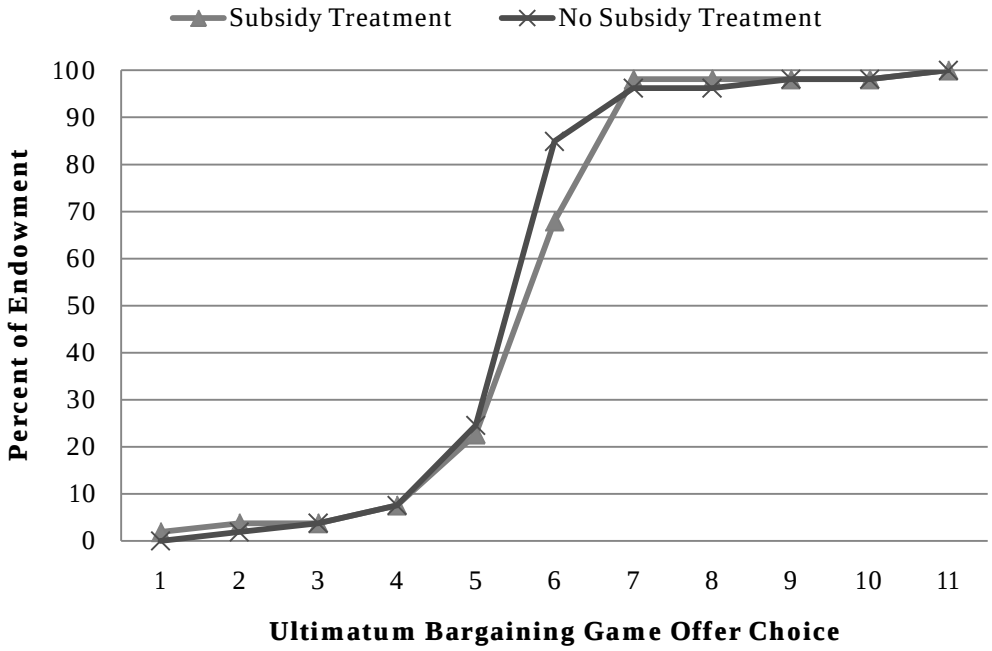

Figure 3. Cumulative distribution functions of proposer offers across treatments

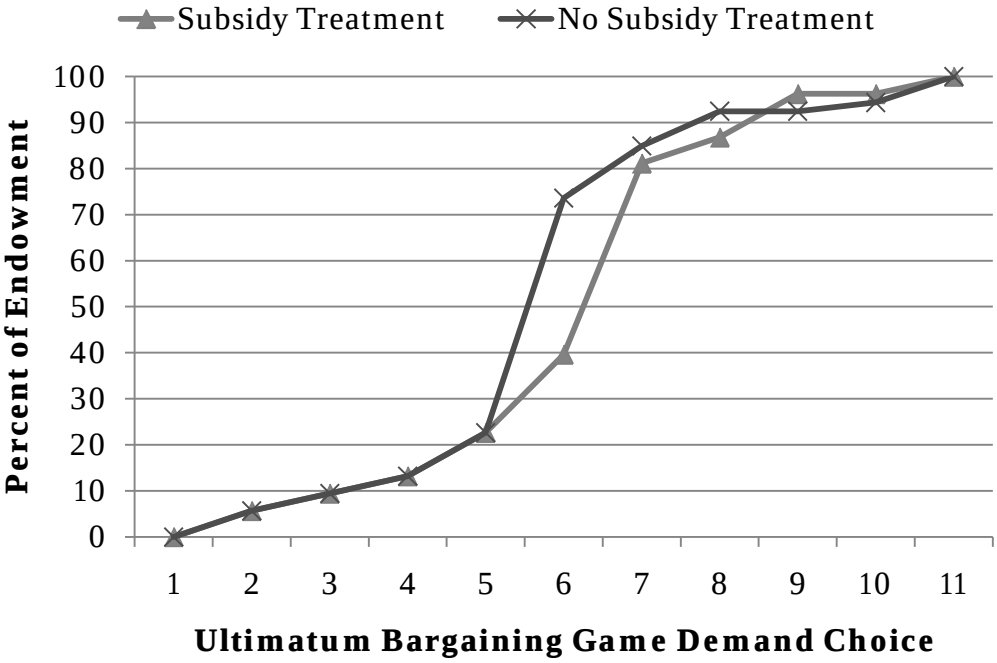

Figure 4. Cumulative distribution functions of respondent demands across treatments